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"Bovine Actinomycosis, its Pathogenesis and Treatment by Vaccines."

By W. M. SCOTT, F.R.C.V.S., Bridgwater.

resented to the British Medical Association Annual Meeting at Glasgow.

In addressing a meeting composed of those interested in human and comparative pathology, one is limited to a subject possessing an interest common to both, not so much perhaps from an academical as from a practical point of view. Although our respective spheres of work must of necessity vary in detail, the choice of a suitable subject is made somewhat easy, because our general ground work is the same and our objective, *i.e.*, combating the diseases that flesh is heir to, is identical. The senior branch of medicine having been established long before veterinary science was perhaps ever thought of in these islands, the late Professor Dick, to give only one illustration, when he founded his school in Edinburgh, enlisted the sympathetic support of the great pioneers of medical thought in the Northern Capital, who assisted him in every material manner, for we find on his staff medical men, both as teachers and examiners. It will be seen, therefore, that our association with human medicine began almost at our conception. Since then, much progress has been made, and in this we have not been slow in carrying out the tenets and discoveries of human medical science, and applying them in our routine practice among animals. From this standpoint alone, without mentioning many others, we owe the profession of medicine a great debt of gratitude. For many years past certain branches of our two callings have worked together in closest unison, but along the lines of contact there still exist obstinate barriers which should long ago have been crumpled into dust. To-day, however, the fact of the British Medical Association having invited practitioners of comparative medicine to join in its deliberations, seems to augur well for the future, and for that closer union which one of your most illustrious ex-Presidents has, since 1888, persistently endeavoured to bring about. I have chosen the subject of my theme, not with the object of introducing to your notice data of which you are already cognisant, but rather with the idea of emphasising our lack of knowledge of the disease in question, particularly with regard to the life history of the parasite and its classification, combined with curative measures. With these important objects awaiting scientific solution, scope indeed exists wherein researchers from both callings may meet on common ground. As a clinical disease, actinomycosis has been long recognised in animals. In man, however, it is an open question whether it has not been largely overlooked, and, perhaps, somewhat ignored in routine practice until recent years. Consequently, the disease in man was considered rare. With a better technique, combined with thorough investigations, however the trend of events suggests that the disease is more common in man than many human practitioners perhaps realise.

DEFINITION.

Actinomycosis may be defined as a specific non-contagious disease principally affecting cattle, but occasionally seen in man, horses, dogs, sheep, pigs, goats, and caused by the pleomorphus, *streptothrix actinomyces* or "ray fungus," manifesting itself principally in the connective tissue elements in the region of the head and neck, or in chronic suppurative processes involving the jaw bones.

HISTORY AND DISTRIBUTION.

Langenbeck isolated the fungus from the pus of chronic abcesses in man, and Hahn, in 1870, found the organism in the tongue of cattle. Bollinger in 1877, demonstrated its pathological significance in bovines, and Israel, in 1878, its pathogenic import in man. Since then the fungus has been isolated from diseased tissues by investigators all over the globe. In cattle the disease appears to have a predilection for low-lying marshlands, a fact which suggests that moisture is essential to the organism's saprophytic existence, and this is the view held by the majority of practitioners of comparative medicine.

BACTERIOLOGY.

The pathogenic qualities of the "ray fungus" are well known and fully recognised. Its life history, morphology and classification, however, require further and fuller investigations. The fact is, it appears that the actinomyces belong to a very large and nebulous mycelial group, some of which are highly virulent, while others are undoubted commensals, hence it is that one authority, in describing the organism, gives certain and specific

data, while another sums up his conclusions in such a manner as to suggest a fundamentally different type of parasite. Thus, Hutyra and Marek state " the organism thrives in the presence of oxygen, but only moderately so under anærobic conditions."

" On agar they form small points resembling dew-drops, which gradually become white.

On gelatine they sink to the bottom as the result of liquefaction, the granules assuming eventually a red or yellow colour.

On potato, if thinly sown, the colonies are at first yellowish-grey and later reddish-yellow.

In broth they grow at the bottom as a whitish mass, the medium itself remaining clear.

The fungus will also grow on eggs, in sterilised milk, in water and other media.

Staining.—The filaments and spores stain readily by Gram or by Gram-Weigert, while the club ends may be stained with carmine, eosin, etc., etc."

Friedberger and Frohner write: " Growth is not stopped by the exclusion of air (*facultative anaerobe*). On dry blood serum the growth is chalk-like, after a fortnight the colonies become pale yellow, red or brick-red in the centre and confluent, whilst on the periphery a transparent dirty white stratum forms. Similar growths take place on agar, glycerine agar and gelatine. On potato the colonies are yellowish-grey and finally white and granular."

Buchanan says: " the organism stains readily with the common aniline dyes, is gram positive and not acid fast. It may be regraded as a facultative anaerobe."

In broth the organism forms spherical or mulberry-like masses at the bottom of the tube. On agar and glycerine agar the colonies at first resemble tiny amber drops, enlarge, remain discrete or coalesce to form a distinct lichen-like membrane having a dusty appearance. Hoare, (Wooldridge) states the organism is a facultative anaerobe.

In glycerine broth, or on glycerine agar it forms small white granules, while old cultures beçome yellow and dry looking.

The clubs are easily stained by Plaut's method, while the filaments and coccus-like bodies stain readily by Gram.

From these extracts it will be gathered a very chaotic state of affairs exists, at least so far as the cultural properties of the fungus are concerned. From my own observations made during the process of preparing vaccines from *materiês*, sent by practitioners in various parts of the country showing clinical symptoms of actinomycosis, and from cases in my own practice, I have found cultivation of the organism in some instances comparatively easy, while in others it has been most difficult, and in a few instances, no growth has been obtained. In some, growth only occurred in the absence of oxygen, while others appeared to prefer aerobic conditions. The best cultural material was invariably secured from those tissues recently invaded by the mycelia, and very often these were of pure growth. On the other hand, cultures obtained from the pus were always contaminated, growth very slow and, in some instances, no growth at all. If ineffective pus is carfully examined it will show a number of characteristic sulphur-like granules, and under the microscope they will be seen to vary from 0.10 m.m. to 2.0 m.m., in diameter, or even larger. The smaller colonies are often of a translucent greyish-white colour, later becoming dark yellow or dark grey. These granules, when crushed and examined under the microscope, are composed of a central portion of more or less dense interwoven dichotomous branching threads radiating towards the periphery, interspersed between these threads are small round or oval shaped coccus-like bodies sometimes arranged in chain form. In the older colonies surrounding the periphery, arranged in rosette form, are club-shaped bodies, their apices being directed towards the centre. The filaments are composed of protoplasm surrounded by an envelope; many of these divide and form short rods, which again subdivide and form the coccus-like bodies which in turn develop into rods; these, elongating, form threads. In regard to the production of clubs several views are put forward.

Hers and Bollinger looked upon them as buds. Bostrom considers they are specific hyaline degenerates, while Bougert and Scheel view them as degeneration products of the epitheloid cells.

The actinomyces are classified by some authorities with the streptotrichoses, cladotrichoses, and leptotrichoses.

The fungus growing upon the tissues, as we have seen, forms granules composed of radiating mycelium club-shaped bodies, and coccus-like bodies, some being aerobes, and others anaerobes.

Gasperini described the casual agent of bovine actinomycosis as actinomyces suplhurens, albus and luteorosens, Jelenewsky (in actinomycosis of the lips) as actinomyces labialus bovis, while Liquieres and Spitz combine the *aerobic* actinomyces bovis with the anaerobic actinomycosis Israeli, and the actino-bacillus into the group of the actinophytes, and the disease produced by them they call actinophytosis. It is quite evident, therefore, that grouped under the disease known as actinomycosis, one is dealing with a varied species of parasites, the complete classification of which will entail an enormous amount of spade work. At the present state of our knowledge one may almost be justified in placing the disease under the heading actinomycosis or pseudo-actinomycosis.

Mode of Infection and Tissues Involved.

The life history of the parasite to those who admit its saprophytic existence is practically unknown.

Medical opinion appears to incline to the view that it leads a saprophytic existence upon the alimentary mucoses, its parasitic propensities developing with an abrasion of that membrane. When it is remembered, however, that cases of pyorrhœa and dental caries in men are legion, one would think that under these circumstances more cases of actinomycosis of the jaw would be seen. The practitioner of comparative medicine inclines strongly to the belief that the organism leads an active existence on vegetable matter, and one is almost tempted from practical experience to go as far as to conclude that the vegetable kingdom is the natural habitat of the fungus, and animal tissue its accidental home. Certain it is that some farms are more predisposed to the disease than others and, further, some fields on these farms produce a larger number of cases. Moreover, climatic conditions appear to exercise a considerable controlling influence on the growth of the fungus, as the number of cases is largely seasonal. Thus, the dry summer of 1921 and the abnormally dry succeeding winter reduced my spring time cases by 75%, while the very wet summer of 1917 gave an abnormal increase. In that year lingual actinomycosis was particularly rife, and I attributed this fact partly to the wet season, and in part to the excessive growth of thistles, the prickles of which acted as an excellent "inoculant." On this point, it may be be interesting to note, lingual actinomycosis is very common in the ox. These animals prehend their food with their tongue, consequently if there is any hard fibrous or prickly element in the fodder, that organ becomes an easy victim to inoculation. Equines, on the other hand, scissor their food with their incisors, and in this animal the tongue is very seldom seen infected. Further, permanent pasture land is a more prolific scource of infection than land which is under cultivation. Pointing again to the possible fact that reproductionof the parasite outside the animal body does take place under unmolested conditions, and speaking from my own experience, where I see one case on cultivated farms, I see ten to fifteen cases on permanent pastures. It was originally stated that grain growing districts produced the greater number of cases, but I venture to suggest priority should be given, at least in this country, to low-lying, damp marsh lands The region of the head and neck in cattle being the most common seat of the disease, strongly suggests that the active germ is ingested with the food. A perfectly healthy and unabraded mucous membrane conceivably offers in itself sufficient resistance to mycelial infection. Nevertheless, one is justified in suspecting the lodgment of the fungus in the various duct orifices in the oral mucosæ, especially if it is combined with other pyogenic bacteria, may be capable of setting up the disease, and doubtless it is by this channel that the salivary glands become *primarily* affected. Greater facilities of infection, however, occur in those cases where the mucous membrane is abraded, as, for example, in the eruptive phases during dentition. Hence it is young cattle are more predisposed to the disease than older animals. The most common seats of infection, so far as my own records go, work out at the following ratio: tongue 35%, jaws 33%, lips 3%, sub-maxillary 7%, sub-parotideal 15%, pharyngeal and retro-pharyngeal 7%. Primary infection of the skin is very rare indeed, but secondary contamination is not at all uncommon. I have encountered several infections of the mammæ in pigs, probably a dozen in all, six in the cow and two in the goat, the channel of infection in these cases pointing to the milk duct. The internal organs are also occasionally infected, although seldom diagnosed during life. Observers in charge of abattoirs have detected the disease in the alimentary and respiratory systems, the liver, spleen, kidneys, testicles, uterus and brain.

Pathogenesis.

No sooner does the organism invade the tissues than a rapid development of the cellular elements takes place as the result of the inflammatory reaction. Some of the filamentous fragments and coccus-like bodies are taken up by the phagocytes and carried into the healthy adjacent tissues, and always with the possible result that where the organism is not destroyed fresh infective foci are established. Where the tongue is the seat of infection, consequent upon bacterial stimulation, this organ undergoes rapid fibrosis, attains an enormous size, often protrudes from the mouth and, losing its contractile power unless relief is obtained, the animal dies from inanition. The dorsal surface and sides of the tongue present an irregular appearance as the result of nodular elevations. These nodules are firm in consistence, and of a greyish-yellow colour. When the tongue is cut into the parenchyma is hard and fibrous, shewing numerous circumscribed projecting centres varying in size from a millet-seed to a pea or even larger. Some of these areas present advanced degeneration changes. In the larger and older nodules the substance may be cheeselike. Surrounding these areas are dense masses of newly formed connective tissue cells, penetrating between which one may detect under the microscope mycelial elements. Occasionally the deep lingual lymphatic glands are affected. This added infection seriously hampers therapeutical measures, a fact which has struck me on many occasions. In advanced and very aggressive cases ulcerative changes take place on the mucous membrane, and extension to the buccal mucosae by contiguity is not uncommon. If these ulcers are carefully examined they will be found studded with angry bluish-red granulations, between which are small yellow or greyish-yellow nodules. The edges of the ulcers are usually well defined. Where the jaw bone is involved the first step is an acute ulcerative mucositis in the vicinity

of the teeth at the seat of inoculation, followed by an acute alveolar periostitis, which extends and enlarges the bone. In the meantime the medullary elements become invaded, giving rise to a rarified granular ostitis with the formation of cavities packed with infective elements. As the disease advances, the teeth may loosen and fall from their sockets, or infection may spread towards the cutaneous structures which in due course become involved, break down, and from the sinus infective pus discharges, an angry looking cauliflower-like growth developing on the bone at the point of exit. In the pharnygeal region the disease manifests itself as an infective granuloma, varying in size from a hazel-nut to a cricket ball, or even larger. These may eventually become distended by purulent accumulations, or they may remain hard and fibrous throughout, and tending to increase, embarrass respiration and deglutition. In the sub-maxillary and parodital regions the neoplasm takes on a round or oval shape, the salivary glands seldom escaping infection. At first it is surrounded by an oedematous effusion, giving an irregular contour to the growth. In due course this becomes absorbed, leaving the growth, which at this stage is hard and fibrous, sharply defined. In time it tends to soften in the centre and discharges an infective pus. In the lungs the disease may simulate the miliary form of tuberculosis, the nodules being of a greyish-yellow colour, or large purulent cavities may develop in the parenchyma. In the mammary gland one or more soft degenerate infective centres develop, surrounded by dense fibrous elements.

Pus, in the truest types of actinomycosis, is a somewhat rare *quantum*, and in some cases is not present at all, especially in the early stages. It would appear, in this slow growing disease, that a rapid and hyperactive fibrosis commencing almost at the outset thwarts the suppurative processes. This may be due to a rapidly developed antitryptic content on the part of the host's blood, or to low tryptic power of the pus itself, or both of these factors may be acting in unison. In this the disease closely resembles *dyscomycosis equi*. In old standing cases where pus is much in evidence it would appear the usual pus producing organisms are the *prima facie* factors. In a typical case the pus is usually thin, watery and sometimes sanious, suggesting a lack of leucocytosis, but occasionally one comes across a case where the pus may be defined as "laudable." These latter, in my experience, are the most amenable to treatment. On the other hand, the worst cases are those where the pus is thin, ichorous and emits a sickly penetrating smell. If a close search is here made a foreign body will invariably be found, such as a blade of grass, straw fibre, barley or rye, grass awns, etc.

Therapeutical Measures.

These may be described under three separate heads, *medical*, *surgical* and *biological*, and it is hardly necessary to point out they may be applied singly or collectively according to the exigences of the case.

Medicinal Therapy.—Contrary to the generally accepted view of the profession, I have long held the opinion that the salts of iodine exercise no direct specific action whatever against the actinomyces, although it cannot be denied that animals placed under such treatment make good and last recoveries. I do not offer any explanaton as to what the nature of the chemo-therapeutical action is, which is indeed doubtless, very complex, but I do know from considerable experience that where secondary involvement of the adjacent lymph glands occurs, drug therapy is generally futile. I am thinking now particularly of those cases of lingual actinomycosis where the sublingual lymphatics are seriously involved. I suggest, therefore, that the therapeutical action of iodine occurs through the lymphatic system and possibly also through other ductless glands. By activating these glands it is just possible the newly formed dense connective tissue elements are disintegrated and absorbed, giving greater freedom of action to the phagocytes and the antibacterial body fluids against the mycelial foci. Potassium iodide has long held a prominent place in the treatment of actinomycosis, but for several years I have used biniodide of mercury combined with citrate of soda with, I think, better results.

Surgical Therapy.—Where the neoplasm is circumscribed and localised, surgical removal gives highly satisfactory results, but where the disease invades structures the removal of which would leave the animal economically useless, the only course open is to remove as much of the disease area as possible with the knife and the curette, and place the patient upon a course of biniodide of mercury and vaccines. After operating on such cases, I make a point of rubbing common salt over the operation wound, then pack with gauze soaked in iodised petrol, which is left *in situ* for three days, after which time the packing is removed, the cavity filled with salt packs which are renewed as often as necessary. Except for keeping the packing in position sutures are seldom used.

Biological Therapy.—With regard to treatment by vaccines, a very common fallacy exists in the minds of some practitioners, who look upon vaccine therapy as the Alpha and Omega of all treatment, and are content to ignore collateral measures which go to facilitate recovery. To inject a vaccine into an animal with active mycelial foci surrounded by and maybe almost cut off from adjacent healthy tissues, and expect immune bodies activated by the antigen to reach the bacterial zone is really asking for the impossible, and in like manner to anticipate the disappearance of a large fibrous growth surrounded by a dense matrix in the centre of which is a cavity distended with pus is also unreasonable. In the case of lingual involvement

where the animal is seen early, fibrosis being present only in a moderate degree and where the lymphatic glands are quite healthy and active, vaccines alone have given me satisfactory results, but I opine that even here additional treatment with iodine expedites recovery.

After an experience of forty-three cases treated by vaccines, I consider the treatment has a high therapeutical value. I always use autogenous vaccines, and where secondary infections are in evidence, those bacteria are also embodied in the antigen. The initial three or four doses are sterile, the succeeding half-dozen attenuated, while the subsequent doses are virulent. In injecting virulent cultures, after a degree of immunity has been established, I have never seen any untoward results of importance, while, as therapeutical agents, they are far ahead of sterile vaccines. At the seat of inoculation an occasionally indurated nodule develops, which usually disappears in a short time. In some three or four cases a local abscess has formed, but this under simple treatment soon subsides. As regards dosage, the vaccines are standardised by *Wright's* blood cell count method. Generally speaking, the initial dose of the mycelial fragments is a thousand million each for the sterile, attenuated and virulent vaccines. The subsequent doses injected weekly in each type of antigen is increased by multiples of 2, 4, 6, 8, 10, 12, 15, 20, etc., etc., until a maximum dose has been reached. The highest dose of virulent vaccine I have given to the ox is a billion fragments. It may be of interest to note the cases which made the best recoveries were those where the organism grew best under aerobic conditions, and *per contra* those which preferred anaerobic methods proved the most obstinate.

Tabular analysis of the cases treated by vaccines works out as follows. Some of these were taken in the early stages and responded well to treatment, some were moderately advanced but made good responses, the remainder were old standing neglected cases, requiring very prolonged and persistent measures.

TISSUES EFFECTED.

	Tongue.	Jaw.	Parotideal.	Pharyngeal.	Jaw & Parotid.
No. of cases	16	15	6	3	3
Recoveries :					
Complete :	15	11	4	2	1
Partial :		1	1		1
Failure :	1	3	1	1	1

SUMMARY AND CONCLUSIONS.

1. The bacteriology of the group actinomyces is most complicated and unsatisfactory, giving ample scope for the joint action of human, comparative, and plant pathologists.
11. If the parasite does lead a separate existence outside the animal tissues, its haunts and habits should be investigated, for until this point is cleared up, preventive measures must ever be empirical.
111. How the salts of iodine act therapeutically in cases of antinomycosis is an interesting field for speculation, and possibly by investigations carried along these lines, other side tracks in the large field of chemical therapy might be discovered also.
IV. Although the clinical data of actinomycosis is generally based upon an even and more or less regular plane, the same observation cannot be applied to the *causa causans*, this latter being most diverse and confusing. It must be confessed, however, cases are seen in practice occasionally which simulate actinomycosis and are not so, save in macroscopical appearances only.
V. Vaccine therapy is a valuable adjuvant to the therapeutical rôle, virulent antigens giving by far the best and most uniform responses.

WORKS CONSULTED.

Hutyra and Marek : "Special Pathology and Therapeutics of the Diseases of the Domestic Animals."

Friedberger and Frohner : "Veterinary Pathology."

Hoare's : "System of Veterinary Medicine."

Buchanan : "Veterinary Bacteriology."

The Veterinary Tour at Whitsuntide.

BY ONE OF THE PARTY.

When mentioning to a friend a few days previous to starting that I was hoping to do the tour to Belgium initiated by Professor Hobday, the esteemed Editor of the *Veterinary Journal*, the remark was made that I should have "a time of my life," and, indeed, such it proved to be. Every detail for our comfort and enjoyment had been carefully thought out, the general arrangements for the tour having been placed under the management of Dr. Henry S. Lunn, Ltd., of tour-organizing renown.

The Membline Palace Hotel, Grande Place, Bruges, was our home for the period and it would be difficult to find a more comfortable and convenient place at which to stay. After the journey of Saturday, Sunday was spent very quietly in Bruges, and to those who had not been there before "the Chimes of old Bruges" became an increasing fascination.

On Monday morning we left Bruges by the 8.45 train under the experienced and enjoyable guidance of Professor Hobday, and after a two hours'

journey through well-farmed country, largely set out for crops of rye, corn, beet and potatoes, passing Ghent en route, we arrived at Brussels, where, by the forethought of Professor Hobday, we were met by a Belgian confrère, M. Ferdinand Charlier, who most kindly spared no effort in ensuring that the time at our disposal in Brussels should be enjoyably and profitably occupied.

A motor charabanc was engaged for a two-hour ride in Brussels and to visit some places of historic interest, namely, the Royal Palace, the Courts of Justice, Arc de Triomphe, the Academy and Museum of Fine Art, noticing in passing many ancient, fine buildings and the wide, well-kept boulevards. A great number of good-looking, well-groomed carriage, saddle and commercial horses were met on our journey. After lunch a visit was made to a canine establishment at which, amongst many valuable animals, was the champion Griffon of Belgium valued at 60,000fr. ; after this we were taken to the artificial ice manufactory and the abattoir. It being a public holiday, work at the latter was in abeyance, but a general impression was gained of its vastness and good equipment : the number of large carcases of veal and the absence of mutton and sides of beef was noticeable at the various depôts.

After leaving the abattoir we next proceeded to the Veterinary College, where instead of hours the same number of days would have been full of interest to the professional members of the party.

A thorough description of the numerous and thoroughly equipped buildings, operating and lecture theatres, museums, laboratories, stables, cattle lairs, and small animal quarters, with the spacious grounds is impossible in a paper such as this, a personal inspection being the only way to realise its completeness. The College is State supported.

Some very interesting cases were shown by a most energetic and kindly teacher of the College (Professor Liègeois), amongst which was a stallion affected with dourine, also the same disease in a mare, being one of several that had been contaminated by him this season ; the Professor demonstrated the actual trypansome of the malady to us, mounting a blood smear from an infected guinea pig ; also cases of epizootic lymphangitis in the stallion and suspected rabies in the dog were exhibited.

Tuesday morning was occupied in visiting some of the important places of interest in Bruges—which was the original capital of Belgium. In the afternoon a most enjoyable time was spent at Blankenberg, a charming seaside resort a few miles from Bruges, and on our return in the evening a pilgrimage was paid to the scene of the martyrdom of Captain Fryatt and others.

Wednesday was the day arranged for a tour of the Ypres salient, the distance covered by motor charabanc being over one hundred miles, and when—in passing through them, or when they could be plainly seen—our most genial courier pointed out such places as Thurout, Roulers, Passchendaele Ridge, West Roosbeke, Poperinghe. Harthous Forest, Polecapelle, Menin Road, Hellfire Corner, Salvation Corner, Mount Kemmel, besides many others, and actually arriving in Ypres, the anxious times of not long since were vividly recalled to memory. On the return journey we visited several dug-outs and trenches, passing along the side of the Yser River, on to Dixmude, where we saw the battery and heavy gun "Big Bertha," the second largest possessed by the Germans, which was intended to fire upon Paris (the shell fired weighing approximately three-quarters of a ton). It was a most solemn and inspiring tour, and in passing the many cemeteries, reminded one of the countless and glorious sacrifices that had been made for us.

Thursday was devoted to an agricultural excursion ; after journeying about thirty miles by road, passing through Belgium into Holland, we arrived at Bissiken, there embarking on steamer across the Scheldt for Flushing. From thence train was taken to Middleburg and it being market day the place was very busy—typical Dutch peasantry being much in evidence. During the journeys each way in Holland, one was struck with the similarity to our country in the North of England and Scotch Lowlands, the condition of the horses and horned stock being excellent. The agricultural implements appeared to us somewhat antiquated, but manual labour was all that could be wished for, both as to hard work and competence.

The prominent breed of pigs was the large white, sheep seemed to be very scarce, but a fair number of goats was seen. Dogs in Belgium and Holland are largely used for light draught work.

On Friday we were fortunate in having the amiable manager of Dr. S. Lunn to conduct us on the tour set out for the day, namely, to Knocke and Zeebrugge ; the former with its immense batteries along the coast line, and at the latter the Mole, Harbour, and entrance to Bruges Canal.

On Saturday the tour concluded, and after a most pleasant sea crossing and rail journey to London, we separated for our respective homes filled with reflections of the very happy and instructive time we had spent together.

The party had been composed of Members from London, Staines, Leicester, Tunbridge Wells and Brighton, together with ladies, who had so much contributed in every way to the great pleasure of the tour.

Any extra efforts to get away were more than amply recompensed by the very enjoyable and instructive time experienced, also finding on return that despite one's absence "the practice has gone on all right," besides being most proud of our own country and profession, and satisfied with the advantages we possess for carrying on the same.

The Veterinary Record.

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VETERINARY RESEARCH.

At a luncheon speech at the Jubilee Show of the Northallerton Agricultural Society, Lord Lascelles took the opportunity to criticise the curriculum and the one portal system of the Royal College of Veterinary Surgeons. The whole of that part of the speech which was devoted to the subject was teeming with inaccuracies and it is evident that the speaker had been entirely misinformed regarding the facts. The statement that " their syllabus for the degree included no other form of learning than Veterinary Science " is, to say the least, extraordinary, for later he is reported as having said that " He wanted a method by which the greatest brains of the country could be included, and our universities permitted to grant the degree, subject, say, to the syllabus approved by the Royal College of Veterinary Surgeons, and to have enrolled among them men who had a higher ambition than could be met by the one and only subject—veterinary science. This would promote the same skill as was now brought to bear in the study of the human being." Does his lordship suggest that the medical curriculum is not entirely devoted to the study of medical science, and does he wish veterinary students to be taught engineering or child welfare ?

If the reported statements are correct, they suggest a somewhat chaotic state of mind regarding the future requirements of embryonic research workers.

His lordship is evidently unaware of the fact that the curriculum professes to provide a sound grounding in every branch of veterinary science. That it succeeds in its object is abundantly evident if one studies the results which are obtained by veterinary research workers throughout the British Empire.

No one surely suggests that the licence to practise entitles the graduate to regard himself as a specialist in any branch of veterinary science any more than do similar licences in other professions.

It actually does provide evidence that the necessary foundation has been laid for the subsequent elaboration of specialised study and facilities are provided for this in the form of post-graduate courses. Special examinations are held and degrees or diplomas granted to successful candidates by the Royal College of Veterinary Surgeons and various universities. The only difference between the veterinary curriculum and those of similar professions is that veterinary students receive their pre-graduate training at specially staffed and equipped Schools, and that, like law students, they have but one portal of entry to their profession.

The chief function of the R.C.V.S. is to maintain a uniform standard of graduation and this is and always must be in the best interest of the State and of the profession itself.

Again, we would remind Lord Lascelles that in the case of Foot-and-Mouth disease the policy of slaughter is an economic question and as such is decided by the Government and not by the R.C.V.S.

Such statements as those uttered at Northallerton would not be taken seriously by the initiated, but they may cause harm to the profession in the minds of the ignorant. They certainly will not be well received by the many research workers in animal diseases throughout the Empire

War on Woolsorters' Disease.

THE fear of anthrax which has so long overshadowed the woollen industry bids fair soon to be abolished. For many years the Factory Department of the Home Office has been endeavouring to minimise the risk by removing dust in the opening processes and suspicious blood-stained material. These measures have not proved sufficiently efficacious. Finally, following upon the advice of a Departmental Committee appointed to consider the question, the decision was arrived at to construct a disinfecting station at Liverpool, where all East Indian goat hair and Egyptian wool—which have been found to be particularly liable to be infected—must be compulsorily disinfected on import before sale. The materials at the station are subjected to formalin by a process designed by Mr. E. DUCKERING, who is now in charge of the station. After a year's experience the Home Office are now able to report that the process is a practical success. Wool, so far from being damaged by the treatment, is found to command a higher price. About half the cases of human anthrax in Great Britain originate from imported wool and hair, so that in the immediate future mortality from this cause should be reduced by fifty per cent.—*The Lancet.*

Foot-and-Mouth Disease.

By J. C. HEATHER, M.R.C.V.S. (Sandiacre).

(Presented to the Derbyshire V.A.)

Foot-and-mouth disease is a highly contagious eruptive fever showing lesions in the feet, mouth, heart, pericardium, and they may be found in the placenta in pregnant animals. It affects cattle, sheep, goats and pigs, and it is said that man may contract the disease. It runs a definite course and is amenable to treatment.

Little is known of the cause of the disease, only that it is due to a virus which is ultra-microscopic, and, so far, all attempts to isolate the organism have been unsatisfactory. The virus is easily contagious and may be carried by rats, fowls, dogs, cats, attendants and birds—in fact, anything moving about, and the greatest care should be taken in thorough disinfection in entering and leaving an affected area.

The incubation period varies, and is put down at one to fifteen days, but from observations made in six outbreaks I find the period of incubation is short, but the virus can be carried about in a virulent form for an indefinite period, and it has not been proved that one attack of the disease causes immunity, but in a recent outbreak I have found three cows that did not contract the disease although animals on either side of them were affected.

From the records of treatment in the following animals, the property of the Long Eaton Co-operative Society, consisting of 1 bull, 27 milking and in-calf cows, 8 yearling heifer calves, 9 younger heifer calves to three months old, 2 fat pigs and 7 store pigs, I make my observations on the disease.

The disease in all the cases was ushered in with a rise in temperature from 3 degrees to 5 degrees. The cattle lost their appetite and the milk went. Constipation set in in some cases, and in others a laxative condition of the bowels, but in all the excreta was dark in colour, and a characteristic brown colour. A swelling occurs on the coronet and between the claws which gives great pain and causes lameness, and in a few hours the characteristic vesicles appear on the coronets, and in the mouth and tongue. The tongue is swollen and the animal has great difficulty in swallowing, emitting a smacking sound. Ropey saliva hangs from the mouth, and the animal generally stands with its head erect, and has a wild, painful expression. The vesicles break and discharge an amber-coloured fluid leaving erosions where they have been. Granulations appear in a few hours, and the healing process starts about the third day after the vesicles burst.

In cases where the animals were suspected of the disease and killed, I have seen the membrane of the mouth peel off, especially when the animal has been killed some hours. In no case have I seen a second crop of vesicles in the mouth of the same animal, but I have seen vesicles appearing on the teats of milking animals on the third day after vesicles had appeared in the mouth. In the case of the bull, it was affected in the mouth, and on the third day vesicles appeared on the scrotum. This is, in my opinion, a very important factor in the disease, and is open to a wide discussion as to whether the fluid from the vesicles is contagious or not. My own opinion is that it is not, and, later, I will deal with that. About the sixth day the lesions start to disappear, the salivation lessens, appetite returns, and about the tenth day the animal is feeding normally, and the milk supply returns.

I found the deep milking cows to be afflicted worst. In-calf cows do not carry their calves to the proper time—generally twelve days before time—but the placenta comes away quickly.

Young calves to three months old are frequently attacked with gastritis, which is fatal.

Yearling calves seem to throw off the attack quickly, and make good recovery.

The bull had a very bad time. The lesions in the feet were very severe, and his mouth was badly affected.

The outbreak started with one cow that was in calf on February 25, 1922. She was immediately isolated and reported to the Board of Agriculture the following day, and no decision by the Board was arrived at whether the outbreak was to be isolated or slaughtered until the following Tuesday, February 28, when the Board decided to isolate and treat. In the meantime, the Co-operative Society had slaughtered the first cow attacked and buried the carcase in lime. This was on the 27th of February. No other animal was affected on the Monday night, but on the following Tuesday morning six animals showed symptoms, and at 4 p.m. on Tuesday, 20 animals were affected, and treatment was started on Tuesday night on all the animals on the farm.

One cow showed heart symptoms, and she died on the Friday, March 3. I held a *post-mortem*, and, as a result of it, I changed my treatment by making an addition to it, and had the satisfactory result of seeing my first improvement in less than twelve hours. On the 12th of March I had the great satisfaction of seeing my first lot of affected animals convalescent and on the high road to recovery. In the meantime five of the remaining cows were affected, and one of them showed heart symptoms. This cow died on Thursday, March 9, and on *post-mortem* the lesions were shown on the pericardium.

My treatment was continued till March 14 in full, and afterwards was modified,and on the 21st was discontinued, with the exception of the dressing to the feet which in some cases was continued, especially with the bull.

I found that the cows which were infected later had the disease in a mild form, and quickly recovered.

Treatment.

The feet of all the animals, with the exception of the pigs, were dressed with a liniment composed of carbolic acid, turpentine and rape oil. A pledget of tow was saturated in the liniment and placed between the digits. This was done once daily.

I gave all the animals, affected and otherwise, a mixture consisting of hydr. bin-iod. and potass-iod, three times daily, the dose varying according to the size and age of the animal. This was continued for four days and on the fifth day, after holding a *post-mortem* on the first cow, I added sulpho-carbolate of soda and creosote. I first tried this on 12 cows which were badly affected and not feeding. A dose was given at 2 p.m. and a second dose at 5 p.m. I might mention that these cows consumed only one skep of mixed chop between them in the day. The following morning I found a great improvement in these 12 cows. To begin with, the milk had increased, the animals were brighter, they started feeding, and during the day they consumed eight skeps of mixed chop. I put all animals on this mixture, and after the first two or three doses they started to improve. After three days treatment with this mixture the animals were feeding well and the milk increasing. The yearling calves were given half a dose three times daily, and the three months calves a quarter of a dose three times daily. The yearling calves, and the young calves and pigs were fed on the milk from the affected cows, as the Board of Agriculture stopped all the milk from leaving the premises. I tested the milk for iodine on the fifth day, and found iodine in the milk, and to this I attribute the mildness of the attack in the young calves, yearlings and pigs. When the cows were at their worst they were fed on gruel made from the affected milk and calf-meal.

The pigs were not affected till the tenth day, and they had it in a very mild form. The majority showed the lesions in the hind-feet. One of the fat pigs showed the lesions on the nose and one fore-foot. They never went off their feed entirely. They fed less for a couple of days, but soon picked up again, and the foot lesions got better in a few days. No treatment was given, with the exception of dressing the feet with the liniment daily, and they were fed on the milk from the affected cows which contained the iodine, and kept dry.

On the 12th day the medicine was reduced to two doses per day, and on the 15th day to one dose daily, and about the 18th day discontinued.

The yearling calves and young calves had their medicine discontinued about the 14th day, as they were having the milk which contained the iodine, and the attack was very mild with them.

I kept the animals dry with plenty of dry bedding. The bedding was disinfected before being put down. Dampness, I found, prevented the lesions in the feet healing.

Discussion.

Mr. Fairer, in opening the discussion, thanked the President for a very informative paper, and said he did not understand the heart cases, unless there were heart troubles before the disease started.

The President said there was no sign of heart trouble at the start of the disease, but on the second day a hard metallic ring was very evident. So far as he could remember the *post-mortem* showed seven erosions on the right ventricle.

Mr. Fairer went on to say that he had 80 cows on one farm affected, but he did not find diarrhœa in any one of them. He had, however, great difficulty in keeping the bowels right. There were 45 milk cows and 16 yearlings which were turned out and came into the yard each day. The first treatment taken was treacle and linseed oil, and milk from the unaffected cows. Ten sucking calves had the disease very badly. Those he dressed with tincture of iodine. In two days they began to take milk. The young ones had only treacle and milk and half a pound of Epsom salts occasionally. The first time he visited the farm he found a cow without vesicles, lameness or temperature, and he thought she was suffering from stomach trouble. He gave her a stomach drink, and the following Wednesday she was eating. Later, foot-and-mouth disease was discovered, and on the Sunday the matter was reported to the Board of Agriculture. No word came till Tuesday night, and they were then told to treat the animals. He went on the Wednesday, and found that ten or twelve animals were affected, and it eventually spread through the whole herd.

In answer to Mr. De Ville, the President and Mr. Fairer said they had received instructions from the Board of Agriculture that those herds had to be treated and not slaughtered. When treatment was being given the Board did not interfere in any way, nor did they ask for any report as to results.

Mr. Fairer gave details of his precautions for disinfecting when treating the disease, and said he was more careful even than the Board regulations. He kept a special suit which he put on only in visiting the one farm. If he were dealing with three or four outbreaks he would have a similar number of suits. He took care before leaving the farm to get into the bath and spray his mackintosh thoroughly. At the farm he was speaking about they lost eight lambs. They showed no vesicles or frothing—simply lameness, so bad that they could not stand more than a second or two and died in a day or so. He held a *post-mortem* on one lamb, and found absolutely nothing. It looked as though the lamb had died from weakness. No cows died, so he was not able to hold a *post-mortem* on one of them. He had tried two more things for dressing the mouth, but had discovered nothing better than iodine.

The PRESIDENT : I made my mixture by putting 10 grains of pot. iod., 20 grains of bi-iod. of hydr. and added methylated spirits till it dissolved. You will find the best results from three small doses a day. I gave that dose in a pint of cold water, and the creosote I mixed with the spirit, though it does not mix very well.

Mr. FAIRER said he used a similar mixture to the President, but he used 20 grains of each. With regard to whether foot-and-mouth disease had a permanent affect on milking herds he had not been able to observe, but he had been told of a farm where the disease spread some years ago. Before the disease they made nine tons of cheese per annum, and afterwards, with the same number of cows, they had only one ton.

The PRESIDENT said on the farm where he was treating the cows he had the milk separated and butter made. The quantity of butter was not less, but was streaky. That he put down to the milk being contaminated with iodine.

Mr. LEVIE spoke of the practical knowledge of the subject possessed by the President and Mr. Fairer, and thanked them for their remarks. He said their profession was able and willing to carry out the prevention and cure of the disease, rather than the suicidal policy of the law which at present controlled the disease. He spoke of an outbreak at West Hallam, in 1910. He noticed the peculiar smacking of the lips and foot lesions, but there was not that large amount of saliva which he expected. As one of the individuals who did not believe in the present method of control of the disease, he was pleased to find that both the President and Mr. Fairer were with him in believing that they could do it as well as the medical officer in human beings. It was a fact that in the West Hallam outbreak he had practically cured the first three cases before the Board stepped in and took the matter out of his hands. He could not say how long it would have taken to cure the lot, but he was convinced there were other methods than slaughter. He thought each County should deal with its own outbreak. So far as he could see under the Board of Agriculture they were no farther with foot-and-mouth disease than when he was a student 35 years ago.

Mr. FAIRER said he first attended the animals in his case a fortnight before, and all the cows were still living. In answer to a question he said he did not think the animals were free from contagion on the seventh day. He thought they should give them a lot longer.

The PRESIDENT said that on the fourth week with him they had septic infection of the pigs. He found that second infection could result from lying down in dirt. That happened with cows which were passing a brown mucus with the dung. It only happened with cows that were allowed to lay in their own dung. He thought it was not safe to turn infected cows among other cows for a couple of months, but he had never seen the same cows affected twice during his experience in South America. He referred to cows which had completely recovered, and had been two months clear.

Mr. DUCKWORTH expressed the opinion that slaughter was the best method to employ on an outbreak of foot-and-mouth disease, along with thorough disinfection, of course ; but when the disease was raging throughout the country he thought slaughter was of no avail.

The PRESIDENT gave his experience of infection in the cases which had come under his observation, and said the first case was at the Long Eaton Co-operative Society who had cattle brought in a truck from Clifton, where cattle had been collected from all over the country. Some of them were North country beasts. Five days afterwards there was an outbreak at Clifton. No doubt the rats carried the disease from the Co-op. premises to Wragg's farm. He advised digging up the ground and disinfection of the slaughter-house, but that was not done. Dung and offals were taken from that slaughter-house to a tip near where an outbreak occurred that week. He had no doubt, from what he had heard, as to the movements of a particular dog, that dogs visiting the tip took contamination to still another farm in the area. He told of the visit of a slaughtering gang after a visit of a lay inspector, and of the corralling of a herd for slaughter. The stakes were not firmly fixed in the ground, and after three or four bullocks had been killed the rest stampeded. The gang had to chase them about a twenty acre field, shooting the animals in the legs or anywhere to slaughter them. One cow shot in the eye swam the river, and ran about a Long Eaton meadow with blood and saliva flying about. It was not till the next day that the cow was shot. The case was in the hands of the R.S.P.C.A.

The President and Mr. Fairer were thanked on the proposition of Mr. DUCKWORTH, seconded by Mr. PRINCE.

In acknowledging. the PRESIDENT said he did not think that infection was carried by the discharge from the vesicles or by saliva.

The Week at Westminster.

BY OUR PARLIAMENTARY CORRESPONDENT.

During the Committee stage of the Exportation of Horses Bill in the House of Lords, the Duke of Buccleuch moved an amendment to reduce the fee paid to a veterinary inspector for the examination of a horse over five years of age prior to exportation or shipment, from £20, for each animal to 5/-. He said that they all sympathised very much with the object of the Bill and hoped that it would be carried out, but he did not think it was intended, in passing the Bill, that the exportation of all horses except those under five years should

be shipped. It was a very serious matter and would affect the breeding of horses, which was even now difficult enough to carry on with success. A large number of perfectly sound and good horses were exported which probably would not be sold with advantage otherwise.

Lord Lambourne, who was in charge of the Bill, said that he could not accept the amendment, but during the summer recess the point would be considered, and he hoped to meet the wishes of the Duke of Buccleuch. The amendment was, however, agreed to and inserted in the Bill.

The Royal Assent by Commons has been given to the Milk and Dairies (Amendment) Bill.

Foot-and-Mouth Disease.

At question time in the House of Commons, Lt-Col. A. Murray asked the Minister of Agriculture whether he was aware that the conditions under which, within the ambit of existing Regulations, cattle from Ireland after disembarkation at Scottish ports were forwarded inland and collected, provided no real safeguard against the spread of foot-and-mouth disease if present, and whether, in these circumstances, he would allow free movement of cattle, as formerly, after landing ?

Sir A. Griffiths-Boscawen replied that he was satisfied that the Regulations in question, which ensured a period of detention of fourteen days for Irish cattle which had either been sold at the ports or moved direct to farmers, thus checking their movement from market to market, did provide a real safeguard against the dissemination of foot-and-mouth disease. The answer to the last part of the question was, therefore, in the negative.

Texas Fever.

Commander Bellairs asked the Minister whether, in considering the arrangements for the admission of cattle from abroad consequent on the resolution of the House of Commons, he would take the evidence of Mr. Coote Labe, head of the Department of Agriculture in Vienna, in connection with the importation of a number of American milch cows and the precautions that had to be taken to prevent the introduction of Texas fever to the pasture lands of Austria and the precautions which had been in force in successive months after their introduction.

Sir A. Griffiths-Boscawen said that the Ministry's Veterinary Officers were fully informed as to preventive measures against the introduction of Texas fever into this country. As, however, there was no question of the importation of cattle from that part of America where Texas fever existed, he did not think it would be necessary to consult Mr. Coote Labe on the point.

The Milk and Dairies (Amendment) Bill.

This measure, introduced into the House of Lords by Lord Onslow and passed there on July 12th, has now passed its Third Reading in the House of Commons. The Lords have agreed to the amendments made and the Bill will presumably soon be on the Statute Book. It postpones the operation of the Milk and Dairies (Consolidation) Act, 1915, and the Milk and Dairies (Scotland), Act, 1914, until September 1st, 1925. It also provides for power to local authorities to refuse registration of or to remove from registration retailers of milk if they are satisfied that the public health is likely to be endangered by any act or default in relation to the quality, storage or distribution of milk.

Licences may be granted by the Ministry of Health to sell milk under special designations as "Certified," "Grade A," "Pasteurised," and no person not licenced may use such designations.

Paragraph 5, which is of interest to Veterinary Surgeons, reads as follows :—

(1) No person shall, by himself or by any servant or agent, sell, or offer or expose for sale, the milk of a cow suffering from tuberculosis of the udder, and he shall be guilty of an offence under this section if it is proved that he knew or could by the exercise of ordinary care have ascertained that the cow was suffering from that disease.

(2) If any person is guilty of an offence under this section, he shall be liable on summary conviction for a first offence to a fine not exceeding twenty pounds, and for a second or subsequent offence to a fine not exceeding one hundred pounds or to imprisonment with or without hard labour for a period of six months, or to both such fine and imprisonment.

There are further provisions relating to orders to be made by the Ministry of Health which are to be laid before Parliament, and it is laid down that any order made in future by the Minister of Health under Section 34 of the Contagious Diseases (Animals) Act, 1886, shall be made with the concurrence of the Minister of Agriculture.

A question was asked in the House of Commons whether the date of coming into force of the Act of 1915 could be again postponed by the Minister of Health, and it is satisfactory to note the categorical reply of the Minister :—

"I have carefully gone into that with my legal advisors and they are quite satisfied that, as the Bill stands [the Act of 1915] will automatically come into operation on the date named [September 1st 1925] unless there is fresh legislation on the subject and they have no doubt on the subject. If there was any doubt, I should be glad to say that, as far as I can pledge the Ministry, it will not, unless directed by Parliament, by a fresh Bill, do anything to postpone the Act of 1915."

The Adjournment.

Parliament rose for the summer recess on Friday, 4th August, and will not meet again until November 14th.

Clinical and Case Reports.

The Editor will be glad to receive from members and others contributions to this column of reports of interesting cases.

"Grass" Disease Coming South?

By GEORGE ELMES, F.R.C.V.S., St. Albans.

This being the first case of so-called "Grass Disease" that I have seen, I venture to send a few notes on it, and as the diagnosis was confirmed by Mr. Buxton, F.R.V.C.S., there is little doubt as to its identity with the disease that is now rampant in Scotland and the North of England.

Subject.—A three-year old mare of Welsh vanner type, in excellent condition. She was sent to an auction sale two days before being taken ill. Up till then she had been turned out to grass, and used a little in harness. On return from the auction—as she was not sold—she had a feed of oats and chaff, and was turned out again the next day.

Symptoms.—When first seen by me, I was led to believe the animal was choked, as the attendant said it had been retching, but on giving it a feed, the food was seen to pass down the œsophagus, but with a little difficulty. Constipation was marked, temperature 100.4 F., pulse 50.

The next day and onwards the symptoms became well-marked, there was obstinate constipation, which could only be overcome by the use of enemata, accompanied by considerable straining. The eyes were half closed, and there was a little yellow discharge in the inner canthi. Occasionally, the animal would move its jaws, and out would run a small quantity of clean saliva. There was great trembling in the muscles above the elbow and above stifles; persistent sweating around anus, vulva and under tail. Heavy, snuffling breathing, with a thick discharge adhering to the schneiderian membrane. After a week there was reeling gait.

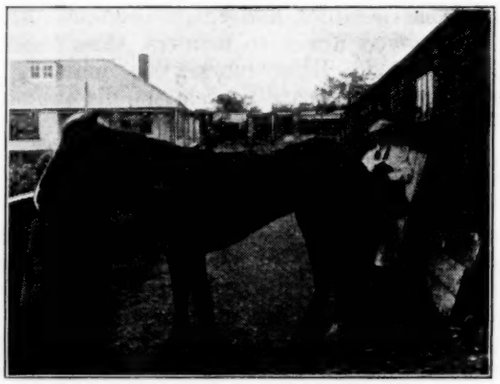
The animal was destroyed 3 weeks and 5 days after the onset of the disease, as it had become so weak and emaciated. During that time the temperature never exceeded 100.4 F., and the pulse did not rise above 58, although it was often very weak and irregular. Sometimes, indeed, it was almost impossible to feel the pulse at the jaw, or to hear the beats, owing to the trembling of the muscles. The "tucked up or grey hound-like" appearance of the abdomen was well marked on the third day, and the skin of the abdomen went into longitudinal folds.

Throughout its illness, the animal would eat a few carrots and a little grass, this was supplemented by drenchings of linseed gruel with salt added. Two days before its death it drank water, about ¼ of a bucketful, this was the first and only time it drank anything throughout the illness.

Treatment.—This consisted in opening the bowels with linseed oil, and when this was attained, giving daily doses of liquid paraffin, to prevent a return of the constipation. Strychnine and extract of digitalis were also administered. An intravenous injection of botulinus antitoxin (*Wellcome* brand) was followed by marked improvement, but this was only temporary, the case was too far advanced when the injection was given for any possibility for recovery to occur.

Post-mortem revealed rather interesting conditions. The turbinate bones were healthy, but on opening the chest cavity there was a distinctly disagreeable odour, the lower half of the lungs were infiltrated with a yellow serous fluid, and showed patches of commencing gangrene—hypostatic pneumonia. The stomach was slightly inflamed. Small intestine inflamed, the walls being about double the normal thickness; the contents resembled linseed oil with a few gas bubbles. Cæcum and large intestine inflamed, this was not more marked in the single colon, but the amount of fæcal matter present was small and somewhat dry, with flakes of thick mucous adherent. Spleen was quite twice the normal size. Heart pale in color.

The photograph well shows the condition of the animal after one weeks illness.



Cryptorchid Operation.

By H. T. RYAN, D.S.O., F.R.C.V.S., Cork.

When speaking to fellow-practitioners of peculiar cases which I came across, I always find they can tell me about some extraordinary cases they have met, and it invariably occurred to me what a pity such and such a case was not reported for the benefit of his brother-practitioners, as in a number of cases the treatment was unique and the result good.

I received a request from a veterinary surgeon as follows: "Can you come round and operate through the flank on a rig for me? He is a three year old cart horse and I removed the right testicle last year but failed to find the left, although I

went in through the canal and gave him a real ripping up. He has been starving since Saturday. I tried to get hold of you but failed to do so."

Operation. I need not go into details further than to say it was the same as described some years ago by E. C. Winter, F.R.C.V.S.

I have not got his article by me and it is some years since I have read it, but so far as I remember the only variation I made was when the skin fascia and external oblique muscle were cut through, I took near hind leg out of hobble and had it pulled backwards before cutting through the external oblique and transversalis, as described by Professor Macqueen in his description of laparo–enterotomy operation. By so doing wounds are not opposite one another when leg is freed; there is a more natural tendency to close, and hence descent of the bowel or hernia are not so likely. However, having got my hand into the peritoneum the first thing that occurred to me, as it did on numerous previous occasions, was that subject had not been properly prepared; the posterior bowel was full of semi-solid ingesta, of which more anon.

I gave a cursory search for testicle for a couple of minutes, but failed to find it, so made myself comfortable as I thought I had an hour's work before me.

I withdrew my arm slightly and commenced on a methodical search and within 20 seconds felt what I thought was a piece of bowel containing semi-solid ingesta. However, before letting it go, I put slight traction on it and found it was "held" —I then brought it out through the abdominal wound, and examination left no doubt as to what I had. It proved to be a soft flabby testicle which I removed with an ecraseur. Peritoneum and wounds were sutured, animal allowed to rise and fasted for 24 hours.

He never missed a feed afterwards, in fact straw bedding had to be removed and sawdust substituted. Temperature never went over 102°, external sutures were removed on the fifth day, and animal returned home on the thirteenth day after operation with instructions not to turn him out for a fortnight.

I may mention in abdominal flank operations I always suture the peritoneum, as I have seen done in the human subject, but which is very rarely described in veterinary operations. I remember when I first saw an eminent surgeon being very particular about suturing the peritoneum, I asked him why, and he told me if he did not suture it he would probably get ulceration. He mentioned a law case in which a nurse gave evidence that the surgeon had not completely sutured the peritoneum, ulceration followed and the operator was mulcted in heavy damages.

Re ingesta in posterior bowel; I have performed the operation of ovariotomy on more than twenty mares and on another occasion opened the peritoneum in search of calculi, etc., and with one exception I always thought how much easier the operation would be if posterior bowel contained none or only soft ingesta. Next time, in addition to physic and fasting, I intend to give animal an enema with six feet of hose in the bowel two hours before the operation.

Luxated Vertebra in Dog Successfully Reduced.

One of the most delicate operations on record, and perhaps the only one of its kind, was performed on an Airedale dog at Bakersfield, Calif., on Feb. 13, 1921.

The dog while playing in the street caught sight of a cat and gave hot pursuit, colliding, while at top speed, with a rapidly approaching automobile. The impact was so great that the dog was hurled to the street in an apparently lifeless condition. He was picked up and placed in another machine and then hurried to a small quiet room in the automobile service station operated by his master.

The dog had begun to show signs of great distress, though he could move only his forequarters; from the middle of the back posteriorly he was apparently paralyzed.

Dr. J. E. Van Sant, veterinarian, was called, and from the examination he made, diagnosed the injury as a dislocation of the spine, and advised an X-ray examination. Dr. W. P. Scott, a roentgenologist, took several pictures of the region of the injury, one of which showed conclusively that the tenth vertebra at the third to the last rib was out of line one-half inch, pinching the spinal cord and causing paralysis.

In the meantime, Dr. George Sabichi, a Bakersfield physician, had heard of the accident, and the dog being, as he said, "a personal friend," he went down to the service station to make inquiries. Learning the particulars of the case, he suggested to Dr. Van Sant, who was puzzling over a very difficult but possible method of saving the dog's life, that he should administer "twilight sleep" for the operation.

This, both doctors declare, is without doubt the first time the twilight-sleep opiate has been administered to an animal. Two doses were given, at intervals of one hour. The dog went to sleep very easily and quickly.

Then came the difficult part—to put the vertebra back in place. To reach it by a surgical operation was extremely hazardous because of the location of the injury. There was one alternative, which was to stretch the spinal column sufficiently to allow the vertebra to snap back into place. Two men grasped the front part and two the hind quarters of the dog. There was a long steady pull and suddenly with a pop like a pistol shot the deed was done. This was early in the afternoon. About midnight the dog came from under the influence of the drug and

whined for his master. His little stumpy tail wagged feebly and he responded to reflex action, showing that paralysis had disappeared.

The region of the injury was kept in alternate hot and cold packs to provide nerve stimulus and to prevent possibility of a blood clot. The length of the body was enclosed in a burlap sling with a splint to hold the vertebra in place. At frequent intervals the dog was suspended in the sling with his feet resting lightly upon the surface of the table to allow free circulation of the blood.

A second X-ray picture was taken Monday morning. This showed the spinal column to be in perfect alignment, proving that the operation was entirely successful.

The animal was pronounced "out of danger" on the second day following the operation, although Dr. Van Sant said it could not take less than three weeks for him to recover completely from the effects of such a serious injury. Each day showed more activity and signs of life in the injured region.

Interest in the case was widespread among medical men because of the unique method of treatment. [*Veterinary Medicine*, April, 1921].

Royal College of Veterinary Surgeons.

FELLOWSHIP EXAMINATION.

A special Fellowship Examination was held on Tuesday, August 8th, when the following candidate was successful:—

EDWARD MORGAN, D.V.H., M.R.C.V.S.
of Puerto Cabello, Venezuela.
Subject of Thesis: Toxicology.
Examiners: Major F. T. G. Hobday, C.M.G., F.R.S.E., F.R.C.V.S.
Dr. G. D. Lander, D.Sc.

W. J. MULVEY,
Chairman.

R.C.V.S. Prosecution.

At the North London Police Court on the 25th July, Mr. V. R. de Boissière, of 22, Dartmouth Park Hill, was summoned by the Royal College of Veterinary Surgeons for using the title of Veterinary Surgeon without proper qualification. The Defendant stated that he held a diploma from a Colonial University. The Magistrate, Mr. Pope, said he thought Defendant had acted carelessly but without intent to deceive, and therefore he would not record a conviction, but he must pay the costs which were assessed at five guineas.

Association Report.

Derbyshire Veterinary Association.

A meeting of the Derbyshire Veterinary Association was held at the Royal Hotel, Derby, on Tuesday, April 11th, 1922.

Mr. J. Heather presided, and there were also present Messrs. McIntyre, Briggs, A. Levie, R. S. White, H. A. King, F. T. Prince, J. J. Hawksworth, De Ville, T. H. L. Duckworth, H. Fairer and E. Marrison (Hon. Sec.).

On the proposition of Mr. DUCKWORTH seconded by Mr. KING, Mr. E. J. Barracliffe, Swadlincote, was elected to membership.

A letter was read from the local authority drawing attention to the danger of Foot-and-mouth disease being carried by veterinary inspectors, and setting out the precautions to be taken. It was laid down that waterproof boots and overalls could not be provided by the County.

The President (Mr. Heather) said the veterinary inspector who was called to cases was not employed by the police. He had found where he had been called to report on suspected cases of Foot-and-mouth disease that he had been summoned by the police on behalf of the owners of cattle. Still he intended including those inspections in his monthly account to the authorities.

In accordance with notice given at the previous meeting Mr. KING moved "To make it obligatory upon members of the County Association to become subscribing members of the N.V.M.A." He said he would like to disavow any intention of any discourtesy to members of that Association. He thought it hardly necessary to go into details of why he had brought the motion forward as they were so obvious. The reasons for becoming members of the National Association were summed up in the preamble to the rules of the local Association. If they thought those objects of protecting their financial and general professional interests could be obtained through the Derbyshire Association alone there was no need for him to speak further on the matter. If that were not in their minds he said there was only one alternative, and that was to become subscribing members of the National Association of which the local Association was an outgrowth. If they were going to make a call on the National Association to better the interests of themselves and their profession they must give substantial backing particularly as regards membership. The body which had only a small proportion of members of the profession in membership could only have a small amount of sway in activities.

Mr. DUCKWORTH pointed out that the Derbyshire Association was affiliated with the National Association, and asked if that fact made any difference to the motion.

Mr. LEVIE in opening the discussion asked what the National Association did for the profession, and what its activities were. He had been a

member of the National Association for years, and just prior to the war, after careful consideration and getting to maturer years, he came to the conclusion that, to him, as an individual member, it was absolutely useless. He withdrew his membership, and he found no difference in any way till he rejoined later. There came into being, if his memory served him rightly, the Veterinary Association of Inspectors of Great Britain, and he was very hopeful of it as he was of the National Association. But the Secretary did not even trouble to answer his letter applying for membership. It appeared to him that associations sprang up with a motive different from that which existed in the Derbyshire Veterinary Association. He had not found the Derbyshire Veterinary Association a hopeless union of members for general welfare. He did not see that the Derbyshire Association, which was trying to draw members together and strengthen itself in unity, was going to benefit by making people put their hands in their pockets and fork out another two guineas for another organisation they might not feel disposed to join. The policy he resented in the motion was compulsion. He pointed out he was now a member of the National, but it was by compulsion. Either he had to pay £2 12s. for the *Record* or a subscription of £2 2s.

Mr. DUCKWORTH said he thought almost all members of the local Association were members of the National. Only two members at that meeting were the exceptions. He did not think the National had done much for the profession as yet. He thought the National would become active when the war ceased, but he agreed with Mr. Levie that nothing had been done up to the present.

The PRESIDENT pointed out the effect of the motion was that the Derbyshire Association would get a member at 10/6, and compel him to pay a further £2 2s.

Mr. DUCKWORTH said if the National was going to be a benefit to the profession they should give it a chance. He thought every one in the profession should take the *Record*.

Mr. LEVIE remarked that before the National took it over the *Record* could be obtained for 15/- It cost nearly four times that to-day. He did not think that pointed to the National being a progressive body. He looked at the matter simply from the point of view of the profession, and he said if the National wanted them to join its duty was first to reconstruct itself.

Mr. PRINCE said he did not think the National was progressive. In fact, it was doing harm to the profession by charging so highly for the *Record*.

Mr. MARRISON expressed the opinion that it was essential that every member of the Derbyshire Association should be a member of the National, but he did not think it desirable that membership should be made compulsory.

Mr. MCINTYRE pointed out that the carrying of the motion would probably mean the expulsion of some of its members by the Derby Society.

Mr. KING replied that the issue appeared rather to have shifted. Members had discussed what the National had done in the past. He was looking to what it would do in the future with an accession of new members. He asked if they were to follow the petty isolation for which the profession had been renowned for so long. He wished the motion to go forward among the various local Associations. It did not appear to him that Mr. Levie was prepared to give the National a chance of doing more. Mr. Duckworth's remarks were hopeful. In view of all the remarks, however, he had to consider whether the motion would inhibit, or be likely to inhibit, non-members joining the local Association. On that ground only would he consider the desirability of withdrawing his motion.

The PRESIDENT and Mr. DUCKWORTH suggested the striking out of the word "obligatory."

Mr. LEVIE said he did not think Mr. King meant they were petty or childish, but that isolation from the parent body was not in the interests of the Derbyshire Association. With that they were all in agreement, but where they differed was in the *modus operandi*, whereby Mr. King suggested they should deal with members joining the local Association. The National had had a chance, but it had, in his own opinion, failed.

Mr. KING then moved:—That all members of the County Association become subscribing members of the N.V.M.A." Mr. MARRISON seconded.

Mr. LEVIE moved:—That members of the Association do not subscribe to the N.V.M.A. unless of their own free will." Mr. DUCKWORTH seconded.

There were eight who voted for the amendment and two for the motion.

The PRESIDENT declared the amendment carried.

It was reported that a member of the Association was employing a castrator on work that should be done by a qualified veterinary surgeon.

The Secretary was instructed to communicate with the member concerned and to report further to the Association.

In reply to a question by Mr. DUCKWORTH the SECRETARY said it was an understood thing that members should make a charge for their services when acting at shows.

Mr. LEVIE contended that an understanding was no use. It would be forgotten. He asked that some rule should be made.

Mr. DUCKWORTH proposed:—No member of this Association shall act in an honorary capacity at any show. Mr. BRIGGS seconded.

Mr. KING proposed:—"That members be entitled to act at all shows in an honorary capacity."

Mr. MCINTYRE seconded.

Three votes were cast for the amendment, and five for the proposition, which the President declared carried.

There followed a paper on "Foot-and-mouth Disease" by the President.

E. MARRISON, *Hon. Sec.*

(Mr. Heather's paper, together with the ensuing discussion, receive separate publication.—Ed.)

Notes and News.

The Editor will be glad to receive items of professional interest for these columns.

Death of Miss Trigger; Twice Mayoress of Newcastle.

We regret to announce, says the *Staffordshire Sentinel*, that Miss Trigger, of the Birches, Sidmouth-avenue, Newcastle, died this (Tuesday) morning.

Miss Trigger, who was the second daughter of the late Mr. William Trigger, of Wolverhampton had lived for very many years with her brother, Mr. R. C. Trigger, F.R.C.V.S., J.P., who is unmarried. She had kept house for him, and assisted him in all his private and public work, and her death has therefore come to him as a very great loss. Miss Trigger's illness commenced with a fall in the house which she sustained about five weeks ago. Besides Mr. R. C. Trigger, she has another surviving brother, Mr. Oliver Trigger, M.B.E., of Hampstead, London, who is a retired analytical chemist, and was formerly Chief of the Chemical Department ot Woolwich Arsenal. He was present at the time of death. She has also two nephews and a niece. One of the nephews is Mr. William Trigger, F.R.C.V.S., of Newcastle, and the other Mr. Ernest Trigger, of Manchester. Her niece, Mrs. Spalding, is associated with the Royal School for the Deaf and Dumb at Old Trafford Park, Manchester.

Miss Trigger was not only one of the best known ladies of Newcastle, but one of the most highly esteemed, and it is not too much to say that she was concerned with practically every good cause in the town. There are two outstanding features of her public interests, for which she will long be remembered. One was the active way in which she supported her brother when he was Mayor of Newcastle in 1910-1911 and in 1911-12. She acted as Mayoress and threw herself into the work most thoroughly, as she did always in what she took in hand. The latter of these two years as Mayoress was specially busy. It was marked by the great coal strike of 1912, with much consequent misery and poverty. Those were the days before education authorities were able to provide meals for children. Miss Trigger, however, assisted the Mayor to get the necessitious children of the borough together. From 300 to 500 of them were assembled every morning at the Salvation Army Barracks, and had a solid meal. This went on for over two months, Miss Trigger actively superintending the arrangements. The money was mostly found by the Mayor and Miss Trigger, the remainder being furnished by friends to whom they appealed.

The second outstanding fact was Miss Trigger's connection with the Newcastle and District Nursing Association. The association was founded principally by the efforts of Mr. Trigger, in the second year of his Mayoralty. He became its first President, and has been its President ever since.

Mrs. Harrison, O.B.E., J.P., of Maer, is the Patron, and Miss Trigger was Chairman of the Executive Committee. She had the association's interests completely at heart, and it was really a part of her life.

Among other causes with which Miss Trigger was identified, that of the Newcastle Police Court Mission must be mentioned.

Conference on World's Dairy Congress, 1923.

In connection with the proposal emanating from the Dairy Industry in America to hold a World's Dairy Congress at Philadelphia in October, 1923, a conference of representatives of the various branches of the Dairy Industry in this country was held on July 28 at the Ministry of Agriculture, under the Chairmanship of Sir Francis Floud, K.C.B., Permanent Secretary.

The Conference was addressed by Professor H. E. VAN NORMAN, President of the Congress, who placed before it the details of the proposal, emphasising the views of the promoters of the Congress that milk was an essential food for man and could, with great improvement in the health of most countries' population, be consumed in much greater quantity than at present. He pointed out that the Congress was intended to provide an international exchange for the most recent scientific knowledge and practice in regard to the dairy industry, was to afford an opportunity for discussing the various systems of regulation and State control of the industry, and was to consider the influence of dairy products on national health, and their vital importance to the development of the people. He stressed the need for increased co-operation amongst producers in improving the conditions of the industry, and generally discussed the benefits which were expected to flow from the holding of the Congress.

There were present representatives of the Royal Agricultural Society, the National Farmers' Union, the British Dairy Farmers' Association, the Agricultural Organisation Society, the Central Chamber of Agriculture, the Milk Producers Association, the Milk Distributors Association, the Milk Publicity Council and also representatives of some of the Overseas Dominions and of the various Government Departments interested. Manufacturers of milk products and dairy machinery and apparatus, Breed and Milk Recording Societies, Educational and Scientific Societies, and other bodies interested were also represented.

At the conclusion of the meeting, the following resolution was passed :—

> That this meeting, having heard Professor VAN NORMAN'S statement of the objects, etc., of the World's Dairy Congress to be held in the United States of America in October 1923, is of opinion that this country should be adequately represented at the Congress, and it requests the Ministry of Agriculture in conjunction with the Ministry of Health to invite the various Associations and bodies interested in the Milk Industry to nominate representatives to serve on a General Committee to organise the representation of the Industry in England and Wales at the Congress.

Army Veterinary Service.

LONDON GAZETTE—WAR OFFICE—TERRITORIAL FORCE.

Capt. J. H. Wright, O.B.E., ceases to comd. a Vety. Evacuating Stn. (May 31).

Capt. J. F. Rankin ceases to comd. a Mobile Vety. Sect. (May 31).

Capt. F. Hopkin, O.B.E., ceases to comd. a Vety. Hosp. (May 31).

Capt. F. Hopkin, O.B.E., is appointed to comd. a Mobile Vety. Sect. (May 31).

Capt. E. R. H. Woodcock relinquishes his commn. (Aug. 2), under A.O. 166/21, as amended by A.O. 332/21, and retains the rank of Capt.